SERVICE MANUAL

TD140/TD140R

Optimum Digital Tuner

Sherwood

Specification

FM SECTION

Tuning Range.....USA Version:87.5-108.00MHz
Europe Version:87.50-108.00MHz

Scanning Frequency interval(AUTO/MANUAL).....USA Version:0.1MHz
Europe Version:0.05MHz

Usable Sensitivity IHF
at S+N+D/N+D
=30dB.....2.0μV(11.2dBf)

THD at 1 KHz 100% MOD,
Mono.....0.12%
Stereo.....0.15%

Stereo Separation
at 1 KHz.....50dB

Signal to Noise Ratio IHF
Mono.....70dB
Stereo.....65dB

Frequency Response
20Hz-15KHz.....+0.5/−1dB

Audio Output Voltage,
1KHz, 100% Mod....600mV

De-emphasis.....USA Version:75μ Sec
Europe Version:50μ Sec

AM SECTION

Tuning Range.....USA Version:520-1710KHz
Europe Version:522-1611KHz

Scanning Frequency interval
(AUTO/MANUAL).....USA Version:10KHz
Europe Version:9KHz

Usable Sensitivity IHF
at S+N+/N=20dB,
Bar antenna.....300μV/m

Signal to noise Ratio,
30% Mod ref.....45dB

Audio Output Voltage,
400Hz, 30% Mod....150mV

Power Consumption.....10watts

Unit Dimensions
(W×H×D).....440×54×235mm

Unit Weight.....2.5Kg

NOTE:Design and specifications subject to change without notice for improvements.

Contents

Specifications 1
Contens 2
Electrical Adjustment Procedure 3,4
Packing 4
Parts List & Top View of P.C Boards 5,6,7,8
Block Diagram 8
Parts List & Exploded View of Cabinet & Chassis 9,10
Point to Point Wiring Diagram 11,12

Electrical Adjustment Procedure

I TUNER SECTION

To make the adjustments the following instruments are necessary.

- AM/FM IF Genescope
- Digital Voltmeter
- High Sensivity AC Voltmeter.
- Oscilloscope.
- Test Loop Antenna (AM)
- Dummy Antenna (FM)
- AM SG (AM Signal Generator)
- FM SG (FM Signal Generator)
- FM SSG (FM Stereo Signal Generator)
- Distortion Analyzer.
- Frequency Counter.

1. AM SECTION

A. IF AM ALIGNMENT (Fig. 1—1)

a. Set the Function switch to AM.
b. Adjust T104 so that figure developed on the Genescope becomes laterally symmetrical with the axis of symmetry at 450KHz and has a maximum amplitude as well.

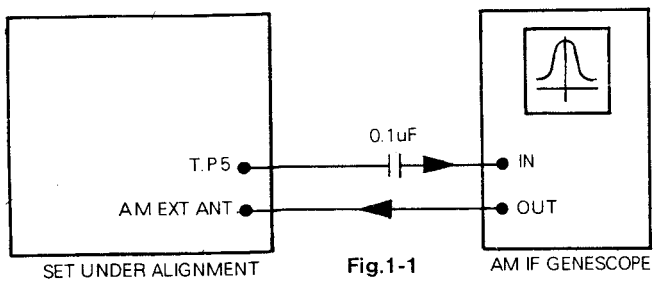


Fig.1-1

B. AM TUNING VOLTAGE ALIGNMENT (Fig1—2)

a. Set the Function switch to AM.
b. Set the frequency of the tuner to 1710KHz.
c. Adjust TC103 so that DVM reads DC 8.5V±0.1V
d. Set the frequency of the tuner to 520KHz.
e. Adjust T106 so that DVM reads DC 0.6V±0.1V
f. Repeat steps b to e until DVM reads given voltage at given frequenies.

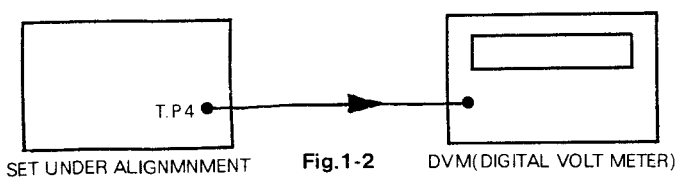


Fig.1-2

C. RF TUNING ALIGNMENT (Fig. 1—3)

a. Set the Funciton switch to AM.
b. Set the AM SG to 30% Modulation at 400Hz and 70~80dB output (3—10mV. which gives field intensity 150~500uV/m to the bar antenna).
c. Set AM SG to 600KHz and set the frequency of the tuner to 600KHz. and then adjust ferrite bar antenna to maximize audio output level.
d. Set AM SG to 1400KHz, and set the frequency of the tuner to 1400KHz, and then adjust TC101 to maximize audio output level.
e. Repeat steps d and e so output is maximized that at the given frequencies.

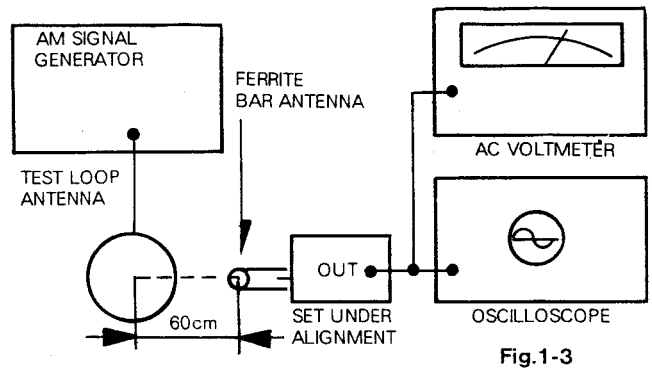


Fig.1-3

D. FINE TUNE INDICATOR

a. Set the AM SG to 1000KHz and abjust the out, put level control so that AM SG output level is 80dB(10mV).
b. Adjust R116 so that TUNE indicator lights up.

2. FM SECTION

A. FM TUINING VOLTAGE ALGNMENT (Fig. 2—1)

a. Set the Function switch to FM.
b. Set the frequency of the tuner to 87.5MHz.
c. Adjust L7 so that DVM reads DC 2V —0.2V

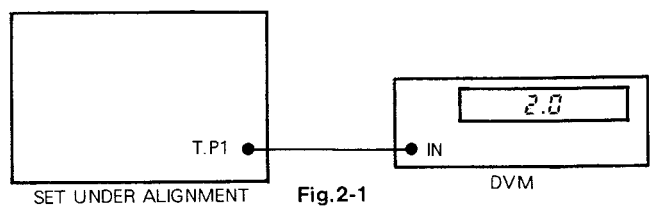


Fig.2-1

B. IF ALIGNMENT (Fig. 2—2)

a. Set the Function switch to FM.
b. Adjust the cores of T102 and T103 so that the S curve developed on the IF Genescope becomes point symmetrical to the center frequency point of 10.7MHz with a maximum amplitude and the voltage between T.P2 and T.P3 is 0V±50mV.
c. If the IF genescope is not available, set tuner detuned and abjust the core of T102 so that noise output is maximized and the voltage between T.P2 and T.P3 is 0V±50mV.

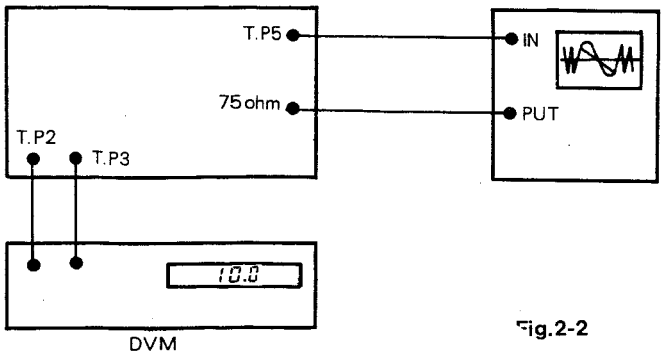


Fig.2-2

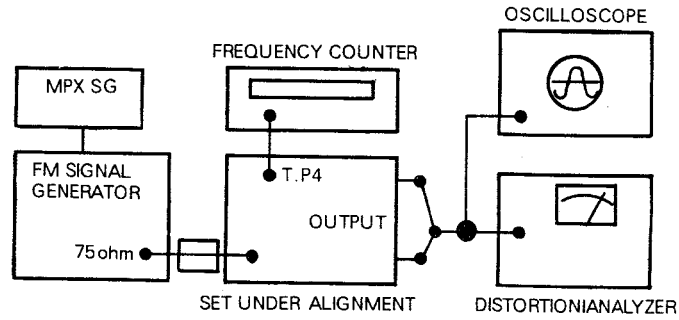


Fig.2-4

C. RF TUNING ALIGNMENT (Fig. 2—3)

a. Set FM SG to 75KHz deviation at 1KHz and 1-2uV output.
b. Set the frequency of the tuner to 98MHz and then adiust L1. L2, L3 and L4 so that audio output is maximized. adjust
c. Set the frequency of the tuner to 98MHz and then adjust core of T103 so that distortion is minimized.

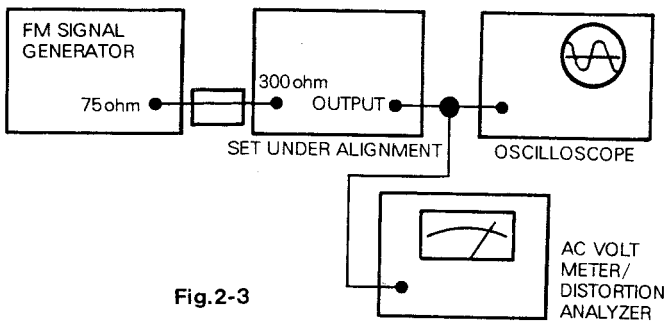


Fig.2-3

D. MUTE LEVEL AND FINE TUNE INDICATOR ALIGNMENT

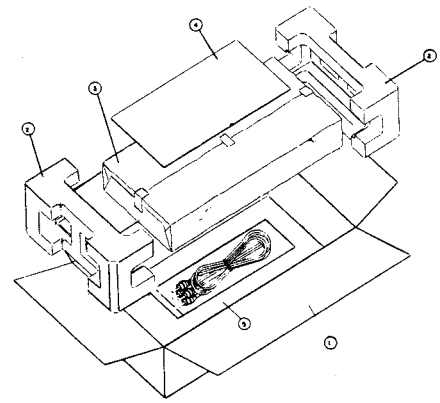
a. Set the MONO/MUTE OFF switch to ON position.
b. Set the FM SG to 7~10uV output.
c. Tune FM SG and the tuner to 98.0MHz and stop adjusting R117 at the position where muting muting marginally occurs.

E. MPX ALIGNENT (Fig. 2—4)

a. Set the MONO/MUTE OFF switch to STEREO position.
b. Set FM SG to 60dB(1mV) and MPX SG to 67.5KHz deviation at 1KHz for left(right)channel and 7.5KHz deviation for 19KHz poilot signal.
c. Set the frequency 98.0MHz.
d. Set FM SG to modulation OFF position and adjust VR1 so that frequency counter reads 76KHz.
e. Set FM SG to modulation ON position and adjust VR2 to minimize output of right(left)channel.
f. Adjust T101 to minimize distortion.

Packing

NO.	PARTS NO.	DESCRIPTION	Q'TY
1		BOX CARTON	1
2	9722008210	CUSHION POLY	2
3	9715000110	FILM SOFT PE	1
4		OPERATING INSTRUCTIONS	1
5	4348000310	DIPOLE ANT	1
6	4328200510	CORD RCA	1

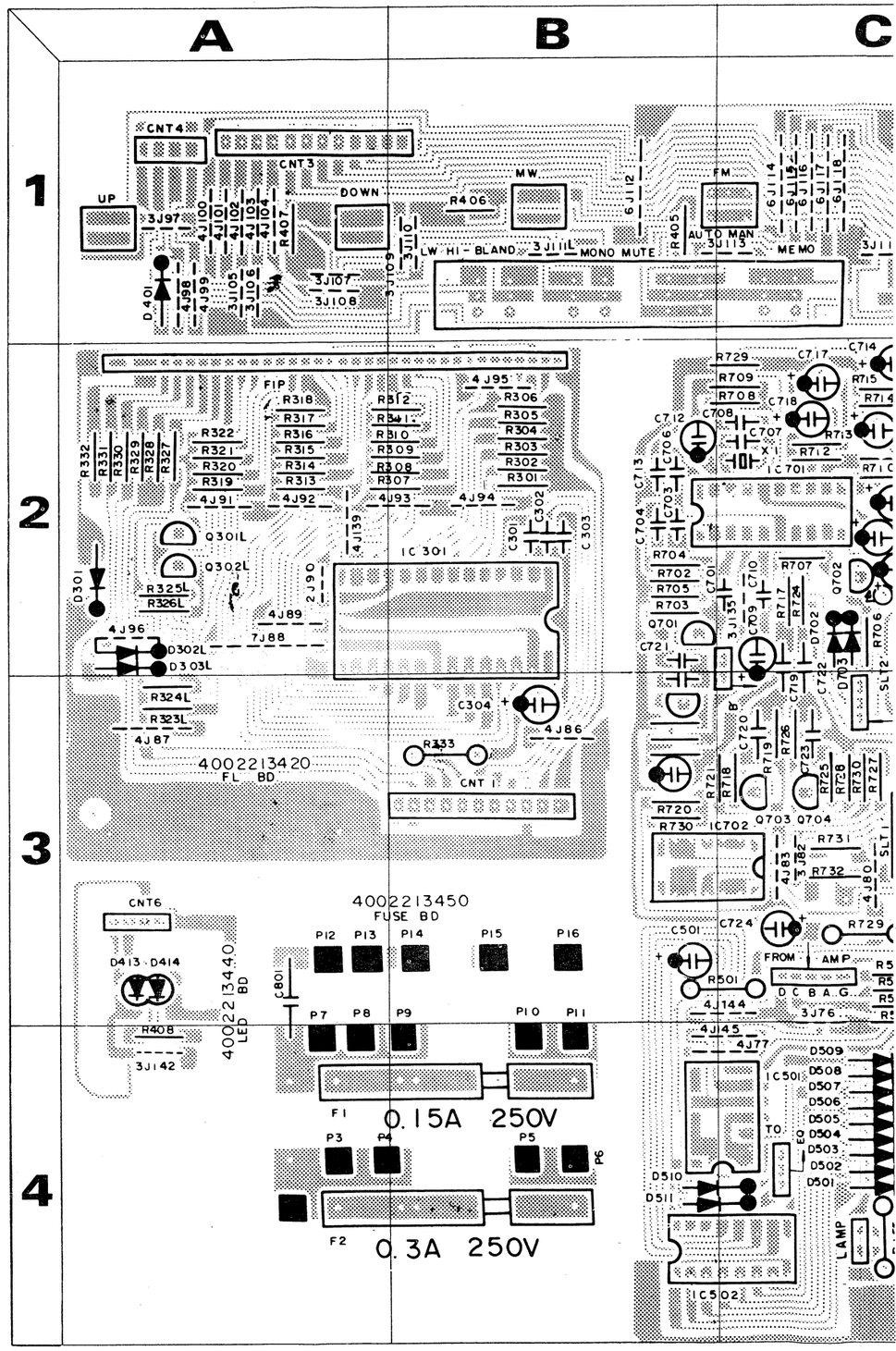


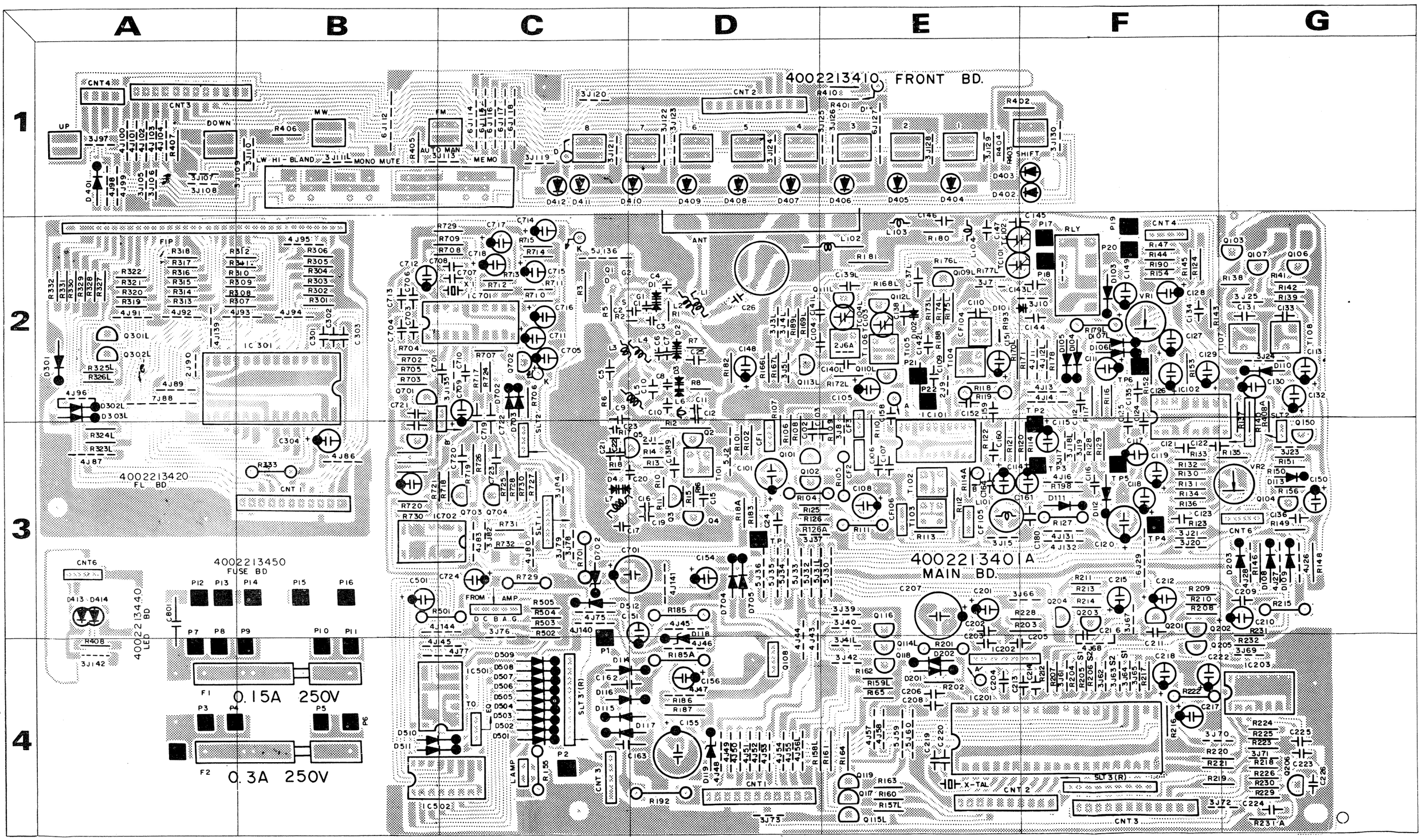
Parts List & Top View of P.C Boards

Ref. No.	Parts No.	Description	Position
● IC			
IC101	2168017119	IC LA 1265	5C
IC102	2168411105	IC HA 12016	67BC
IC201	2138007108	IC TD 9147AP	56D
IC202	2108007102	IC TD 6104P	56D
IC203	2138011110	IC MC 14093	7D
IC502	2138013115	IC MC 14028	23D
IC501	2138009114	IC MC 14011	23D
IC301	2108007101	IC TD 6301AP	12B
● TRANSISTOR			
Q101, 102	2208606104	KTC 1815Y	4C, 6C,
Q104, 106			7C 7B
Q107, 205			7D, 6D
Q206, 117			5D
Q119			
Q105	2208206105	KTA 1015Y	7C
Q202	2208606108	KTC 2240BL	6C
Q2, 4, 5	2008406103	KTC 1923Y	4B, 4C
Q116, 118	2008209191	MPS A55	5C, 5D
Q101	2008409101	LM 9018F	4C
Q108	2028406113	KTD 880	4D
● FILTER			
CF1, CF2	390811001	Ceranse 10.7MA8	4C, 5C
CF104	3908001150	Ceranse SFZ 450B	5B
CF106	3908001020	Ceranse BFU 450C 4N	5C
X-TAL	3908101030	X-TAL 7.2MHZ	5D
● DIODE			
D106-113	2058306101	IN4148	3D, 7B
D501-511			5D, 1A
D201, 202			6B, 6C
D203, 301			7C
D114, 115	2058106100	IN4002	34D
D116, 117			
D118	2058513104	Zener RD 5.6 EB2	4CD
D119	2058513120	Zener RD18 EB2	4D
D101, 102	2058819106	Varactor KV 1235Z	5B, 6B
D1, 2, 3	2058819107	Varactor KV1310A-3	4B, 3C
TC101, 103	3838001010	Cap Trimmer TZ103R200F	5B, 6B
● FET			
Q1	2018213100	3SK T4L	34B
Q2	2018206110	KTK 161YR	4C
Q201	2018211100	2SK 168D	6C
● COIL			
T102	2838501110	Quad DET(A)F	5C
T103	2838501210	Quad DET(B)F	5C
T101	2838001930	I. T F	4C
T104	2848001250	IFT AM	5B
T105	2638201150	OSC AM	5B
T107, 108	2658301100	Filter MPX 19KHz	7B
L1	2648001260	FM ANT(A)	4B
L2	2648001270	FM RF1(A)	4B
L3	2648001280	FM RF1(B)	4B
L4	2648001290	FM RF2(A)	4B
L7	2638001060	FM OSC	34C
L6	2648601270	Inductor 2.2μH	4B
L103	264801400	Inductor 22μH	5B
L104	2648601260	Inductor47μH	5B
● LED			
D413	2308220306	SLR 54GC3-GN	1C
D414	2308220507	SLV 56DC	IC
D401, 412	2308220127	SLR 34URC-3	3A, 4A
			5A, 6A
FIP	2328130901	FIP 7B8S	12B
● RESISUOR T			
R185A	3039339472	M.O 33 ohm 1W	4D
R155, 185	3039151472	M.O 150 ohm 1W	4C, 4D
R192	3039181472	M.O 180 ohm 1W	4D
R186	3069681270	C.F 680 ohm 1/4W	
R187	3069102270	C.F 1K ohm 1/4W	
R104, 105	3069101270	C.F 100 ohm 1/4W	
R111, 119			
R201, 215			
R222			
R127	3069220270	C.F 22 ohm 1/4W	

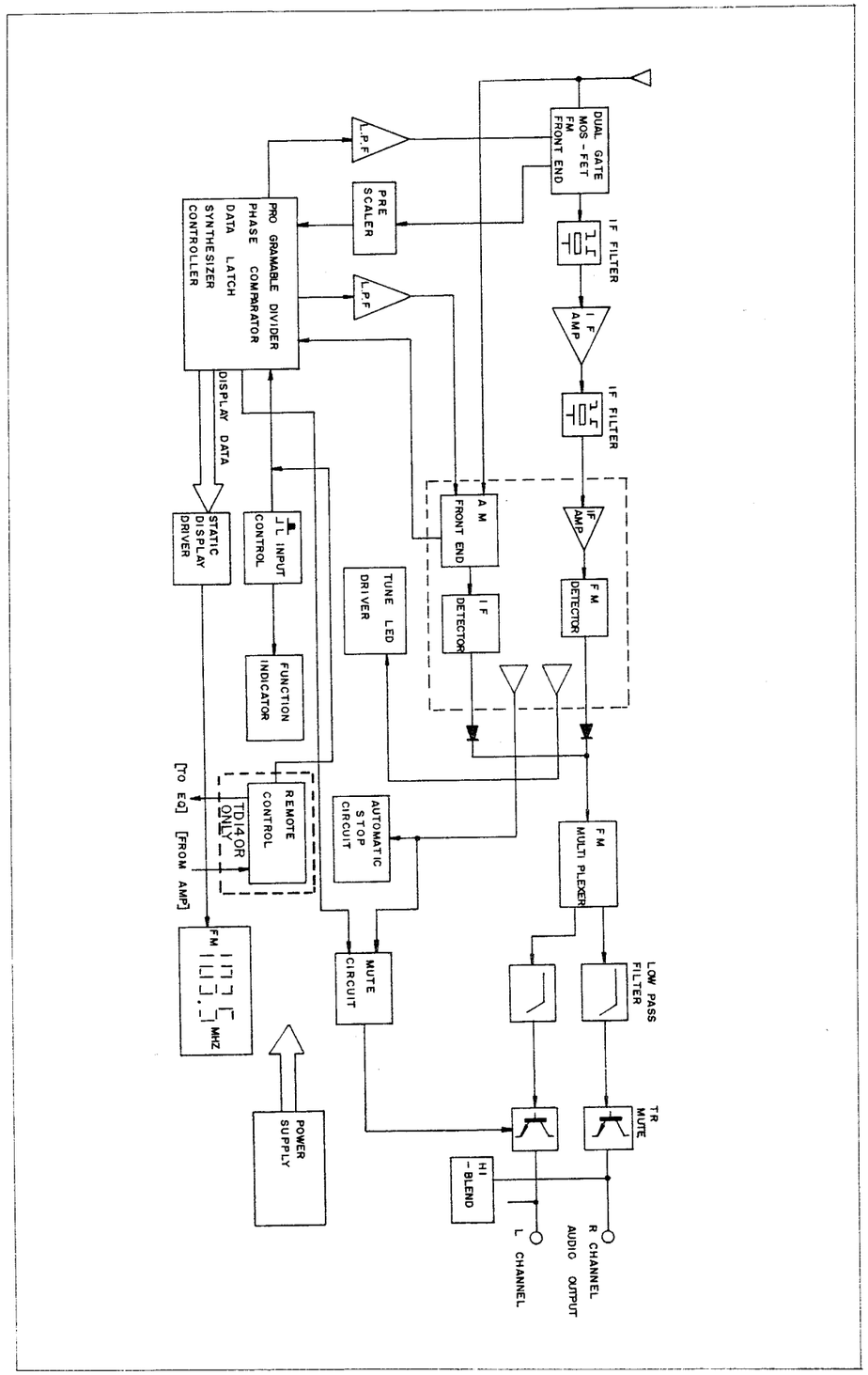
Ref. No.	Parts No.	Description	Position
R333	3069470270	C.F 47 ohm 1/4W	
R114, 208	3069820970	C.F 82 ohm 1/8W	
R228	3069101970	C.F 100 ohm 1/8W	
R102	3069181970	C.F 180 ohm 1/8W	
R109, 110	3069331970	C.F 330 ohm 1/8W	
R218, 219			
R108	3069471970	C.F 470 ohm 1/8W	
R101	3069561970	C.F 560 ohm 1/8W	
R162, 165	3069821970	C.F 820 ohm 1/8W	
R161, 164	3069102970	C.F 1K ohm 1/8W	
R153, 207			
R139, 142	3069122970	C.F 1.2K ohm 1/8W	
R122	3069222970	C.F 2.2K ohm 1/8W	
R113, 131	3069332970	C.F 3.3K ohm 1/8W	
R135, 137,			
R138, 140			
R141, 209			
R106			
R136	3069392970	C.F 3.9K ohm 1/8W	
R123, 147	3069472970	C.F 4.7K ohm 1/8W	
R182			
R144, 152	3069562970	C.F 5.6K ohm 1/8W	
R183	3069822970	C.F 8.2K ohm 1/8W	
R112, 120	3069103970	C.F 10K ohm 1/8W	
R121, 145			
R149, 332			
R150, 160			
R163, 204			
R210			
R180	3069123970	C.F 12K ohm 1/8W	
R220, 221	3069221970	C.F 220 ohm 1/8W	
R114	3069183970	C.F 18K ohm 1/8W	
R125, 130	3069223970	C.F 22K ohm 1/8W	
R132, 148			
R156, 227			
R330			
R216	3069333970	C.F 33K ohm 1/8W	
R231	3069393970	C.F 39K ohm 1/8W	
R3, 148	3069473970	C.F 47K ohm 1/8W	
R151, 502			
R502~505			
R301~322			
R118, 217	3069683970	C.F 68K ohm 1/8W	
R183, 128	3069104970	C.F 100K ohm 1/8W	
R129, 143			
R154, 262			
R203, 205			
R206, 230			
R232			
R171, 178	3069224970	C.F 220K ohm 1/8W	
R223, 224	3069105970	C.F 1M ohm 1/8W	
R225, 226			
R134, 135	3069513970	C.F 51K ohm 1/8W	
R229	3069564970	C.F 560K ohm 1/8W	
R124	3069563970	C.F 56K ohm 1/8W	
R107,	3069561972	C.F 56K ohm 1/8W	
R6, 14, 16	3069561972	C.F 100 ohm 1/8W	
R6	3009121972	C.F 120 ohm 1/8W	
R10	3009561972	C.F 560 ohm 1/8W	
R17	3009332972	C.F 3.3K ohm 1/8W	
R18	3009822972	C.F 8.2K ohm 1/8W	
R1, 7, 12	3009333972	C.F 33K ohm 1/8W	
R11	3009473972	C.F 47K ohm 1/8W	
R2	30091049112	C.F 100K ohm 1/8W	
R15	3009474972	C.F 470K ohm 1/8W	
R9	3009105972	C.F 1M ohm 1/8W	
VR1	3248333220	Semi 3.3K ohm 1/8W	
VR2	3248322420	Semi 22K ohm 1/8W	
R116, 117	3248320325	Semi 22K ohm 1/8W	
● CAPACTOR			
C138	3619471110	Poly 470pF	
C125	3616981110	Poly 680pF	
C135	3619102110	Poly 1000pF	
C147	3619332110	Poly 3300pF	
C212	3479222871	Elect 0.22μF/50V	
C119, C126	3479210971	Elect 1μF/50V	
C130, 132			
C218, 148			
C161			
C217	3479222971	Elect 2.2μF/50V	

Ref No.	Part No.	Description	Position
C114, 115	3479233971	Elect 3.3μF/50V	
C127, 129			
C105, 117	3479247971	Elect 4.7μF/50V	
C111, 151	3479210061	Elect 10μF/35V	
C154			
C118, 119	3479222031	Elect 22μF/16V	
C201, 222	3479247021	Elect 47μF/10V	
C156			
C151	3479247041	Elect 47μF/25V	
C120	3479222131	Elect 220μF/16V	
C155	3409247141	Elect 470μF/25V	
C207	3409222211	Elect 2200μF/6.3	
C108, 210	3479247031	Elect 47μF/16	
C150			
C101	3479210131	Elect 100μF/16V	
C19	3529109210	Ceramic 1pF/50V(CH)	
C13, 16, 17	3529209210	Ceramic 2pF/50V(CH)	
C20	3529809110	Ceramic 8pF/50V(RH)	
C17	3529120110	Ceramic 12pF/50V(RH)	
C23	3529150110	Ceramic 15pF/50V(RH)	
C219, 220	3529270210	Ceramic 27pF/50V(CH)	
C22	3529330210	Ceramic 33pF/50V(CH)	
C1, 3, 10	3529809210	Ceramic 8p/50V(CH)	
C6	3529100110	Ceramic 10P/50V(CH)	
C110	3579470130	Ceramic 47pF/50V	
C123	3579560130	Ceramic 56pF/50V	
C203	3579101130	Ceramic 560pF/50V	
C159	3579331130	Ceramic 330pF/50V	
C162, 163	3579103530	Ceramic0.01μF/50V	
C152, 158			
C159, 202			
C204, 206			
C208, 209			
C213			
C205	3579102530	Ceramic 0.01μF/50V	
C5, 9, 15, 25	3579223530	Ceramic 0.02μF/50V	
C136, 102			
C106, 107			
C226, 104			
C103, 109	3509473530	Ceramic 0.047μF/50V	
C144			
C11	3509101130	Ceramic 100pF/50V	
C4	3509102130	Ceramic 0.001μF/50V	
C146	3579471130	Ceramic 470pF/50V	
C121, 122	3679152120	Mylar 0.0015μF/100V	
C131, 133	3679392120	Mylar 0.0039μF/100V	
C134, 160	3679153120	Mylar 0.015μF/100V	
C112, 223	3679223120	Mylar 0.022μF/100V	
C224 225			
C401			
C116	3679333120	Ceramic 0.033μF/100V	
C124	3609473120	Mylar 0.047μF/100V	
C21, 24	3509103130	Mylar 0.01μF/100V	



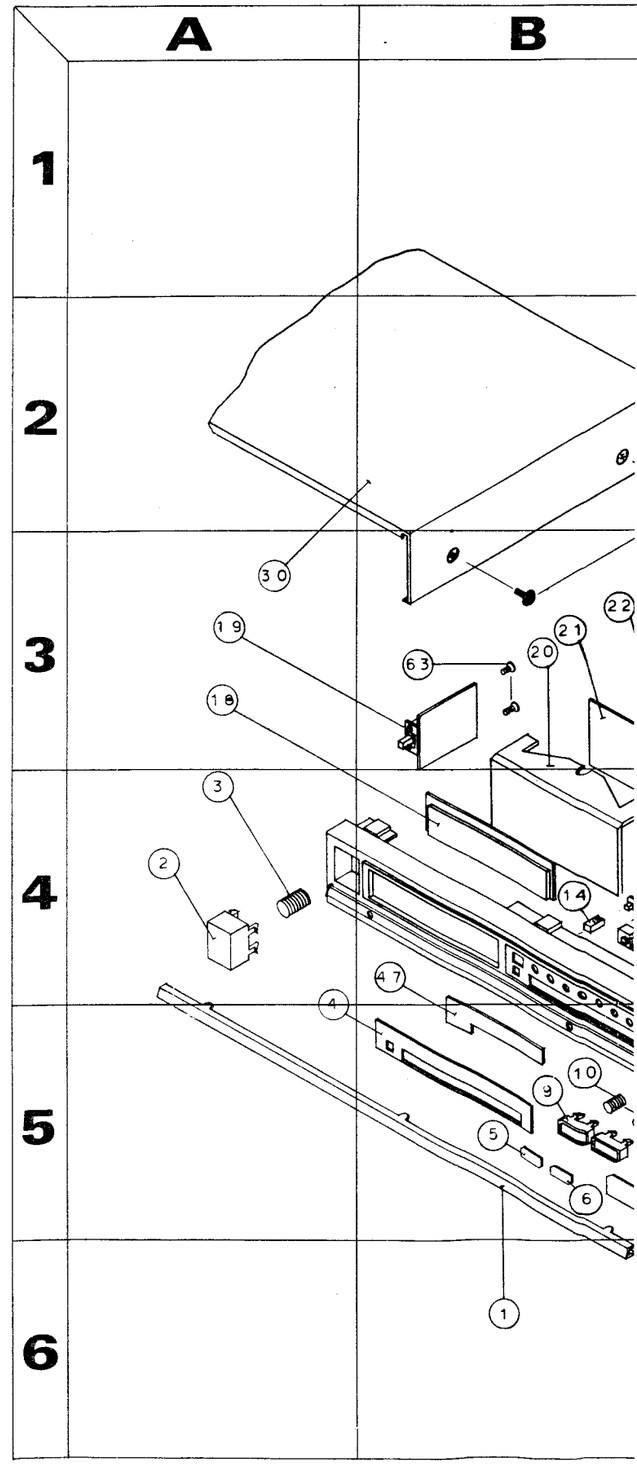

A
B
C
D
E
F
G
1
2
3
4
400221340 FRONT BD.
400221340 1A
MAIN BD.
400221345 0
LED BD
400221342 0
FUSE BD
400221342 0
FL BD
CNT4
CNT3
CNT2
UP
DOWN
MW
FM
AUTO MAN
MEMO
LW HI BLAND
MONO MUTE
SHIFT
D412 D411 D410 D409 D408 D407 D406 D405 D404 D403 D402
D401
ANT
RLY
FIP
IC301
IC701
IC702
IC501
IC502
IC101
IC102
IC201
IC203
X-TAL
VR1
VR2
D413 D414
F1 0.15A 250V
F2 0.3A 250V
FROM AMP
D C B A G
TO
EO
LAMP
SLT3(R)
SLT2
CNT1
CNT6
TP1
TP2
TP3
TP4
TP5
TP6

Block Diagram



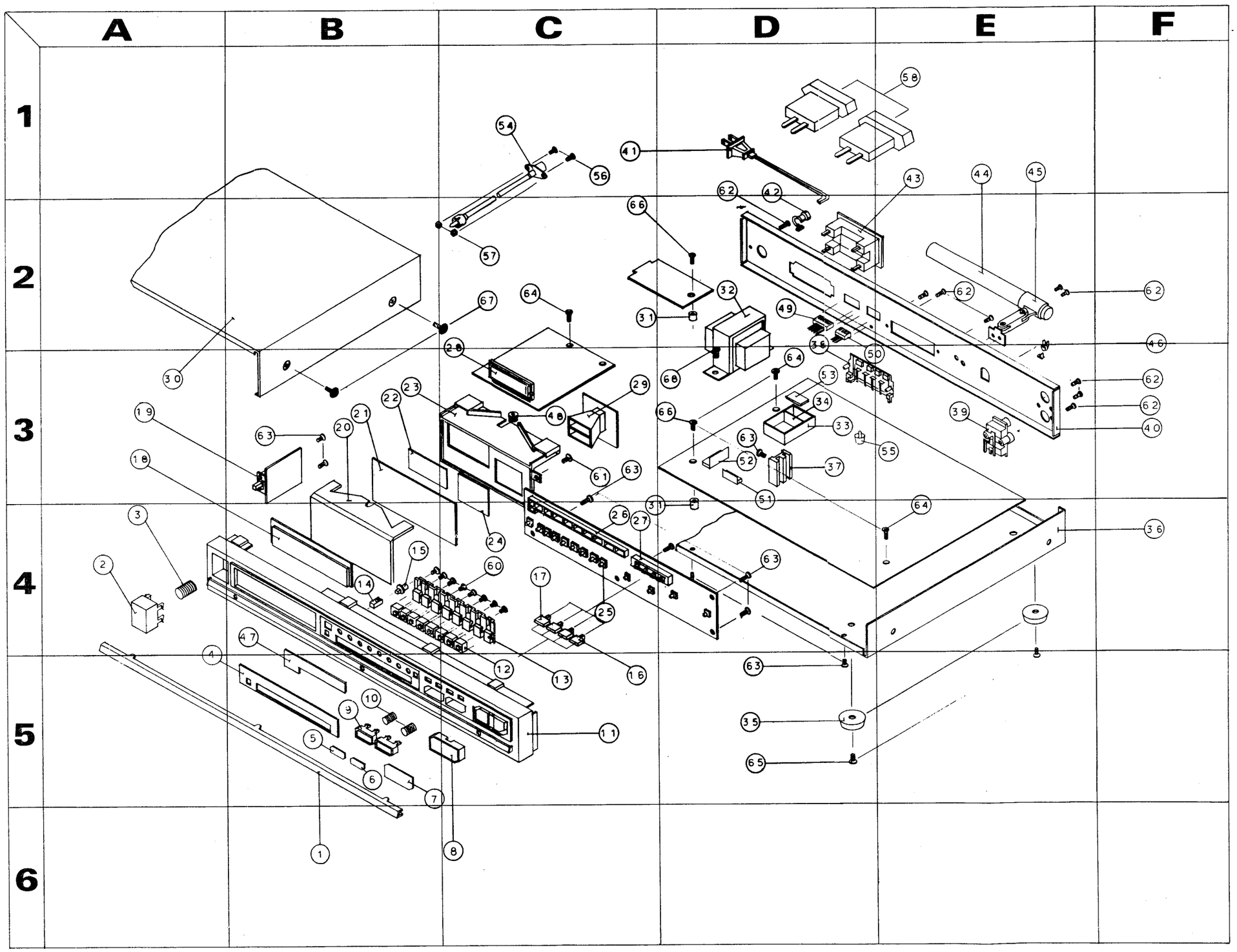
Parts List & Exploded View of Cabinet & Chassi

NO.	PARTS N .	DESCRIPTION	Q'TY	POSITION
1	048623002412	DECOR PLATE(A)	1	A2
2	048545026611	BUTTON PUSH(POWER)	1	C1
3	6555601020	SPRING COIL	1	C1
4	048535009711	INLAY	1	C2
5	048635006216	PLATE KNOB(FM)	1	B2
6	048635006211	PLATE KNOB(AM)	1	B2
7	048625001111	DECOR PLATE(B)	1	B2
8	8545031310	BUTTON TACT	1	A3
9	8545030910	KNOB TACT	2	B2
10	6555003610	SPRING KNOB	2	B2
11	048501005611	PANEL FRONT	1	B3
12	8545027110	CAP BUTTON	8	B3
13	6053001510	BASE BUTN TACT(8KEY)	1	B3
14	8545030810	KNOB PUSH	1	C2
15	6055002810	INSERT BUTTON	1	C2
16	8545026710	BUTTON PUSH(BLACK)	3	B3
17	8545026720	BUTTON PUSH(RED)	1	C3
18	8555012410	DISPLAY WINDOW	1	D1
19	4628005610	SW PUSH(1KEY)	1	D1
20	048573005411	PLATE I11UMINATON	1	D2
21	048535009811	DISPLAY PLATE	1	D2
22	8535009910	DISPLAY FILTER	1	D2
23	6512000310	HOLDER DISPLAY	1	D2
24	8535010410	DIFFUSER	1	C3
25	4658001120	SW TACT	13	C3
26	8523008010	HOUSE LED	1	C3
27	4628042110	SW PUSH(4KEY)	1	C3
28	2328130901	FIP 7B8S	1	D3
29	8555012510	GUIDE LED(A)	1	D3
20	046122011611	COVER TOP	1	D1
31	6705004220	SPACER	2	C4
32	2828041805	TRANSFORMER	1	E4
33	6165120610	SHIELD FENCE(A)	1	D4
34	6165120710	SHIE D FENCE(B) LD	1	D4
35	6335000410	RUBBER FOOT	4	B4
36	6122612310	CHASSIS MAIN	1	C6
37	7505200730	H/SINK REG TR	1	D4
38	4408102610	PUSH TER'BOARD(4P)	1	D4
39	4438101510	JACK RCA(2P)	1	D5
40	046102018011	CHASSIS BACK	1	D6
41	4308001410	CORD AC POWER	1	F3
42	6518000710	STOPPER CORD	1	E4
43	4448100810	AC OUT LET(3KEY)	1	
44	2608207270	BAR ANT AM	1	F5
45	6515000210	HOLDER ANT(MW)	1	F5
46	6513000110	STOPPER CORD	1	D6
47	8535010510	DIFFUSER(ME)	1	C2
48	6715010410	LAMP HOLDER	1	D3
60	8119226081	SCREW #2 PT2.6×8Y	8	C3
61	8119230061	SCREW #2PTC 3×6Y	2	D3
62	8119230063	SCREW #2PTC 3×6B	9	D5
63	8119230081	SCREW #2PTC 3×8Y	9	B4
64	8159230061	SCREW #2WPTC3×6Y	2	C5
65	8159230081	SCREW #2WPTC3×8Y	4	B4
66	8159230141	SCREW #2WPTC 3×14Y	2	E3
67	8119440083	SCREW WSAM 4×8B	4	E3
68	8159440081	SCREW WSAM 4×8Y	2	D4

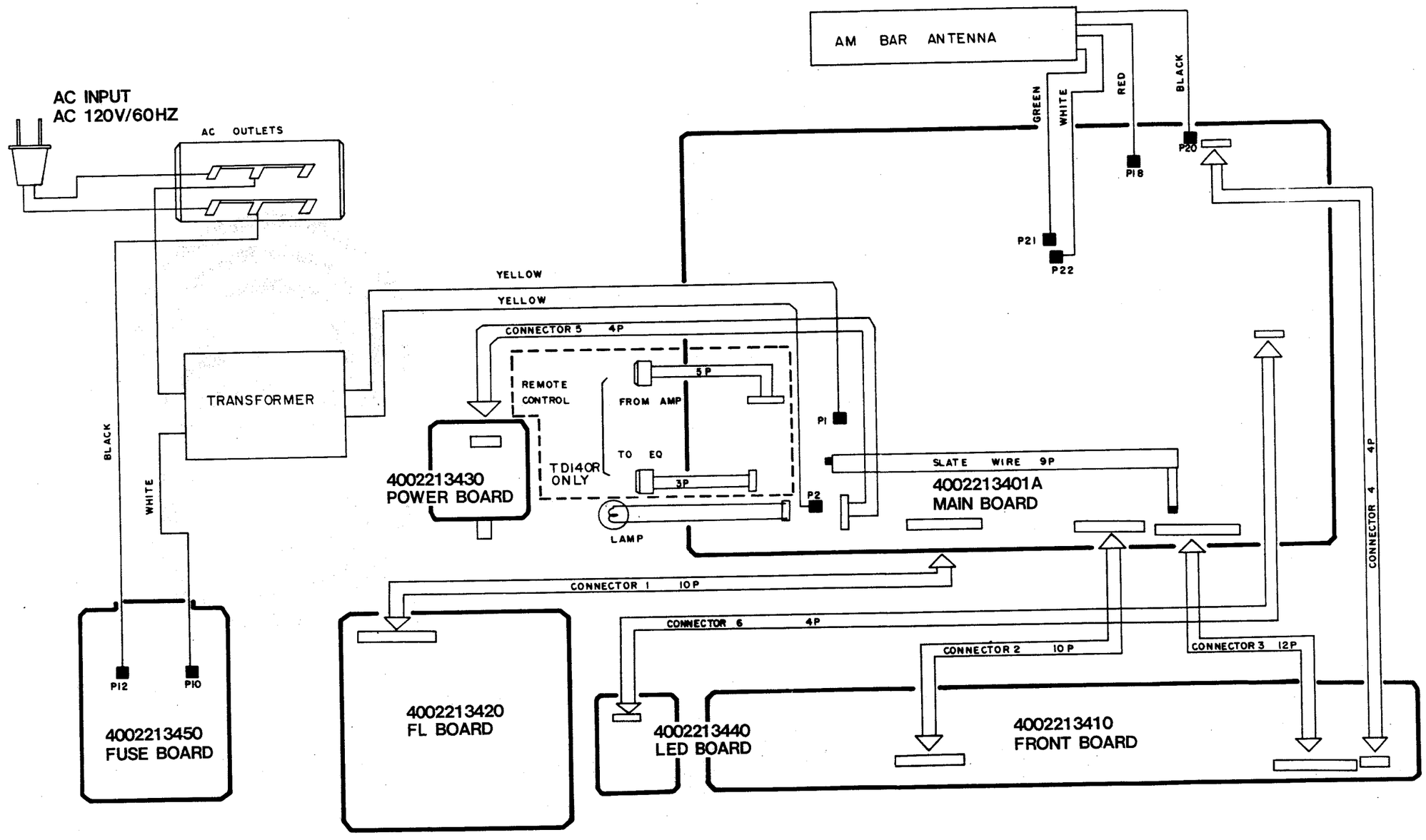


List & Exploded View of Cabinet & Chassis

N .	DESCRIPTION	Q'TY	POSITION
2412	DECOR PLATE(A)	1	A2
3611	BUTTON PUSH(POWER)	1	C1
20	SPRING COIL	1	C1
3711	INLAY	1	C2
3216	PLATE KNOB(FM)	1	B2
3211	PLATE KNOB(AM)	1	B2
1111	DECOR PLATE(B)	1	B2
10	BUTTON TACT	1	A3
10	KNOB TACT	2	B2
10	SPRING KNOB	2	B2
3611	PANEL FRONT	1	B3
10	CAP BUTTON	8	B3
10	BASE BUTN TACT(8KEY)	1	B3
10	KNOB PUSH	1	C2
10	INSERT BUTTON	1	C2
10	BUTTON PUSH(BLACK)	3	B3
20	BUTTON PUSH(RED)	1	C3
10	DISPLAY WINDOW	1	D1
10	SW PUSH(1KEY)	1	D1
3411	PLATE I11UMINATON	1	D2
3811	DISPLAY PLATE	1	D2
10	DISPLAY FILTER	1	D2
10	HOLDER DISPLAY	1	D2
10	DIFFUSER	1	C3
20	SW TACT	13	C3
10	HOUSE LED	1	C3
10	SW PUSH(4KEY)	1	C3
01	FIP 7B8S	1	D3
10	GUIDE LED(A)	1	D3
1611	COVER TOP	1	D1
20	SPACER	2	C4
05	TRANSFORMER	1	E4
0	SHIELD FENCE(A)	1	D4
0	SHIE D FENCE(B) LD	1	D4
0	RUBBER FOOT	4	B4
0	CHASSIS MAIN	1	C6
30	H/SINK REG TR	1	D4
0	PUSH TER'BOARD(4P)	1	D4
0	JACK RCA(2P)	1	D5
3011	CHASSIS BACK	1	D6
0	CORD AC POWER	1	F3
0	STOPPER CORD	1	E4
0	AC OUT LET(3KEY)	1	
70	BAR ANT AM	1	F5
0	HOLDER ANT(MW)	1	F5
0	STOPPER CORD	1	D6
0	DIFFUSER(ME)	1	C2
0	LAMP HOLDER	1	D3
11	SCREW #2 PT2.6×8Y	8	C3
11	SCREW #2PTC 3×6Y	2	D3
13	SCREW #2PTC 3×6B	9	D5
11	SCREW #2PTC 3×8Y	9	B4
11	SCREW #2WPTC3×6Y	2	C5
11	SCREW #2WPTC3×8Y	4	B4
11	SCREW #2WPTC 3×14Y	2	E3
13	SCREW WSAM 4×8B	4	E3
11	SCREW WSAM 4×8Y	2	D4



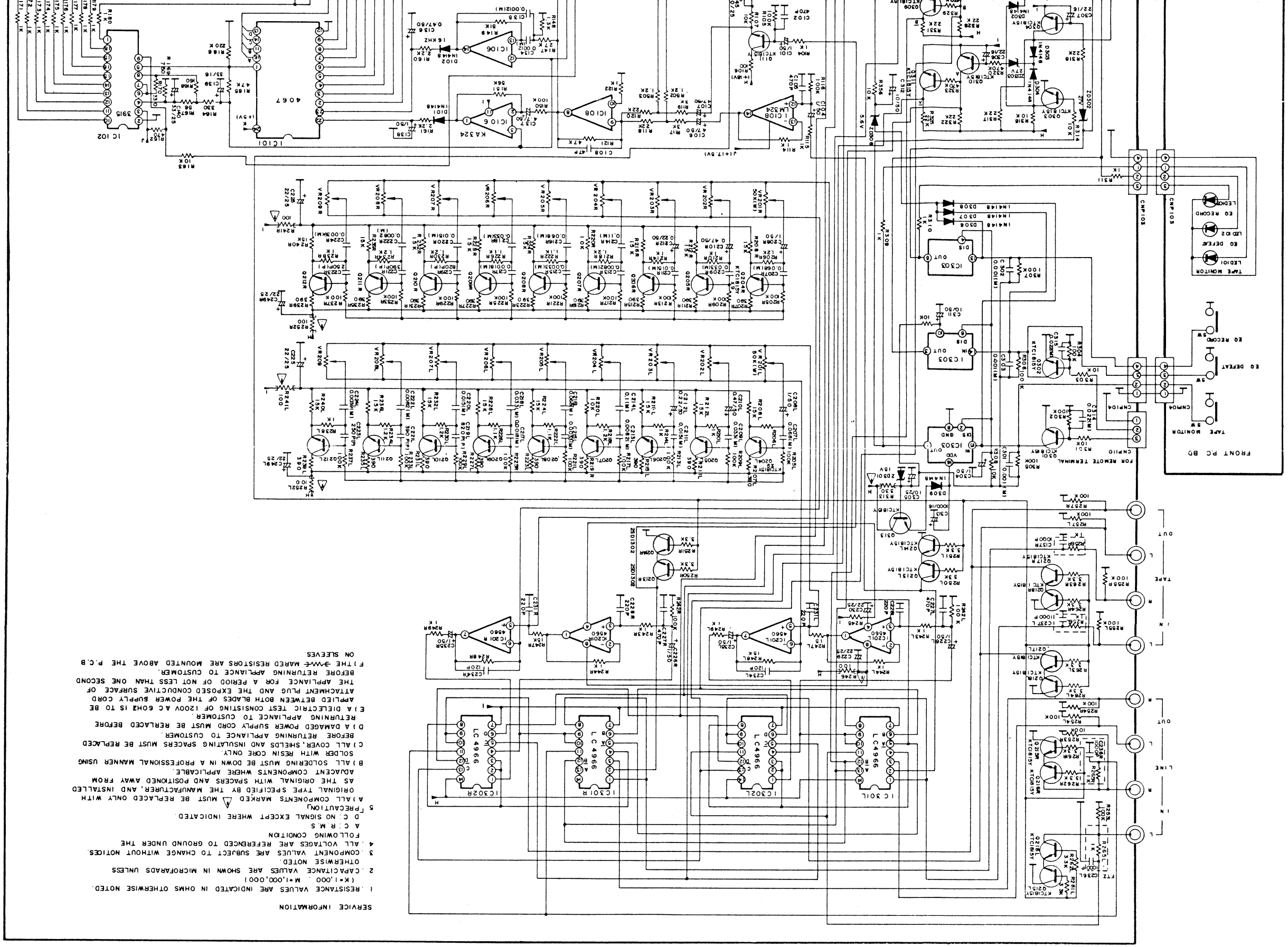
Point to Point Wiring Diagram



Schematic Diagr
EQ 470R

A B C D

Schematic Diagram
EQ 470R



SERVICE INFORMATION

1. RESISTANCE VALUES ARE INDICATED IN OHMS OTHERWISE NOTED. (K=1,000 . M=1,000,000)
2. CAPACITANCE VALUES ARE SHOWN IN MICROFARADS UNLESS OTHERWISE NOTED.
3. COMPONENT VALUES ARE SUBJECT TO CHANGE WITHOUT NOTICES.
4. ALL VOLTAGES ARE REFERENCED TO GROUND UNDER THE FOLLOWING CONDITION
   A. C. R. M. S
   D. C. NO SIGNAL EXCEPT WHERE INDICATED.
5. [PRECAUTION]
   A) ALL COMPONENTS MARKED ⚠ MUST BE REPLACED ONLY WITH ORIGINAL TYPE SPECIFIED BY THE MANUFACTURER, AND INSTALLED AS THE ORIGINAL WITH SPACERS AND POSITIONED AWAY FROM ADJACENT COMPONENTS WHERE APPLICABLE.
   B) ALL SOLDERING MUST BE DOWN IN A PROFESSIONAL MANNER USING SOLDER WITH RESIN CORE ONLY.
   C) ALL COVER, SHIELDS AND INSULATING SPACERS MUST BE REPLACED BEFORE RETURNING APPLIANCE TO CUSTOMER.
   D) A DAMAGED POWER SUPPLY CORD MUST BE REPLACED BEFORE RETURNING APPLIANCE TO CUSTOMER.
   E) A DIELECTRIC TEST CONSISTING OF 1200V A.C 60HZ IS TO BE APPLIED BETWEEN BOTH BLADES OF THE POWER SUPPLY CORD ATTACHMENT PLUG AND THE EXPOSED CONDUCTIVE SURFACE OF THE APPLIANCE FOR A PERIOD OF NOT LESS THAN ONE SECOND BEFORE RETURNING APPLIANCE TO CUSTOMER.
   F) THE ⚠ MARKED RESISTORS ARE MOUNTED ABOVE THE P.C.B ON SLEEVES.